

Serial No. 09/992,599
Attorney Docket No. D546
Firm Reference No. AMDSP212USA

Reply To Office Action Dated October 28, 2003
Reply Dated December 5, 2003

REMARKS

Following entry of the above amendments, claims 1-9, 15-21 and 32-37 will be pending. Claims 10-14 and 22-31 have been cancelled. Claims 4, 6, 8 and 9 have been rewritten as independent claims, without change of scope. Claims 1, 5 and 7 have been amended to clarify their distinction over the prior art. Claims 32-37 have been added.

I. AFFIRMATION OF ELECTION OF RESTRICTION TO ONE INVENTION

The Examiner required restriction to one of the following inventions:

- I. Claims 1-9, 15-21, 30;
- II. Claims 10-14, 31
- III. Claims 22-29.

The Applicants affirm the election made with traverse to prosecute the invention of Group I, i.e., 1-9, 15-21 and 30.

II. ALLOWABLE SUBJECT MATTER

Applicants acknowledge with appreciation the Examiner's indication that claims 15-21 are allowed and that claims 4, 6, 8 and 9 constitute allowable subject matter. Allowable claims 4, 6, 8 and 9 have been rewritten in independent form including all the limitations of the base claim and any intervening claims, without change in scope, thereby putting them into condition for allowance.

III. DRAWINGS

Fig. 4 is objected to under 37 CFR § 1.84. Specifically, the top and left margins of Fig. 4 are objected to. The top and left margins of Fig. 4 have been adjusted to comply with 37 CFR §

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1.84. No new matter has been added. Therefore, withdrawal of the objection is respectfully requested.

IV. REJECTION OF CLAIMS UNDER 35 U.S.C. § 112

Claim 30 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Claim 30 has been cancelled, thereby rendering moot this rejection.

V. REJECTION OF CLAIMS UNDER 35 USC §103(a)

Claims 1-3 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomas, U.S. Patent No. 5,317,141 ("Thomas"), in view of Lin, U.S. Patent No. 5,929,997 ("Lin"). Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomas in view of Lin and further in view of Raeder et al., U.S. Patent 6,057,068 ("Raeder"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Thomas discloses a method of alignment of a first object with a second object. The method includes the steps of determining the location of a feature on a surface of the second object using a probe of a scanned probe microscope, and positioning the first object in a preselected spatial relationship with respect to the located feature. Thomas further discloses an apparatus of an embodiment of the invention includes a rigid support structure or frame 508 to hold mask 502. The support structure 508 also supports first means 520 for locating features on the mask, second means 522 for locating features on the mask, first means 544 for locating features on the wafer, and second means 560 for locating features on the wafer. (Col. 8, lines 50-64). However, Thomas does not disclose detecting a topology of at least one layer. Further, Thomas does not disclose aligning another layer according to an adjusted location of a metrology mark, wherein the another layer is formed on the at least one layer.

Lin discloses a method for aligning a reticle with a semiconductor wafer. Lin does not disclose detecting a topology of at least one layer. Rather, Lin discloses an alignment process that is not affected by surface topology. Further, Lin does not disclose aligning another layer according to an adjusted location of a metrology mark, wherein the another layer is formed on the at least one layer.

Claim 1 as amended recites a method of aligning layers of a semiconductor device and includes, *inter alia*, detecting a topology of at least one layer. Further, Claim 1 as amended recites “aligning another layer according to the adjusted location of the metrology mark, wherein the another layer is formed on the at least one layer.” Neither Thomas nor Lin disclose detecting the topology of at least one layer. To the contrary, Thomas discloses aligning a mask to a wafer by aligning alignment marks on a mask with alignment marks on a wafer. (Col 10, lines 42-56). That is, Thomas discloses a first means 520 for locating features on a mask and a first means 544 for locating features on a wafer are attached to a support frame 508 and are thereby maintained in a fixed spatial relationship with respect to one another. (Col. 10, lines 30-41). Lin does not make up for the deficiencies of Thomas. That is, Lin discloses a wafer alignment technique that provides an optical system for detecting alignment marks 150 formed on a back side of a wafer 140 and directing a reflecting beam from these marks 150 to an alignment detector 130 such that wafer alignment can be synchronously performed **without being affected by surface topology** changes made to a front surface of the wafer 140 as a result of various manufacturing processes performed thereon. (Col. 7, lines 60 - Col. 8, line 1). In other words, Lin discloses avoiding the determining a topology of at least one layer. Further, neither Thomas nor Lin teach or suggest aligning another layer according to an adjusted location of a metrology mark, wherein the another layer is formed on the at least one layer. Therefore claims 1-3 and 5 are patentable over Thomas and Lin, alone or in combination.

Claim 7 depends from amended claim 1 and would be patentable over Thomas and Lin for at least the reasons stated above. Raeder does not make up for the deficiencies of Thomas and Lin.

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That is, Raeder does not disclose detecting the topology of at least one layer or aligning another layer according to an adjusted location of a metrology mark, wherein the another layer is formed on the at least one layer.

Further, claim 7 as amended includes “planarization is performed on a surface of the at least one layer prior to determining the apparent location of the metrology mark.” Raeder does not disclose performing planarization on a surface of an at least one layer prior to determining an apparent location of the metrology mark. To the contrary, Raeder discloses a device for measuring the planarization efficiency of a planarization process. The device includes a substrate 200 having a plurality of die 202 separated by horizontal and vertical scribe lines 204 and 206. The substrate 200 may further include alignment marks 205 readable by a metrology tool. The alignment marks 205 are used for aligning the metrology tool with a desired location on the substrate 200. Col. 4, lines 15-22. The reference alignment marks are used by a metrology tool to determine the location for the measurement prior to planarization. Col. 5, line 58 to Col. 6, line 3.

Therefore, since Thomas and Lin alone or in combination with Raeder do not teach or suggest all of the features of amended claim 7, amended claim 7 is believed to be in condition for allowance.

VI. NEW CLAIMS

The newly added claims, i.e., claims 32-37, depend from amended claim 1. Therefore, claims 32-37 are believed to be patentable for at least the reasons stated above with regard to amended claim 1.

VII. CONCLUSION

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance and notice to that effect is hereby requested. If it is determined that the

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application is not in condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present invention.

Any fee(s) resulting from this communication is hereby authorized to be charged to our Deposit Account No. 18-0988; Our Order No. D546 (AMDS212USA).

Respectfully submitted,
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